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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/528,296	03/17/2000	Kazuhiko Takada	000294	4124

23850 7590 04/04/2002

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EXAMINER

NADAV, ORI

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 04/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Applicant No.

09/528,296

Applicant(s)

TAKADA, KAZUHIKO

Examiner

ori nadav

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 February 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) 8-12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 July 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☒ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

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## **DETAILED ACTION**

### ***Request for Continued Examination***

1. A request for continued examination (RCE) under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 02/19/2002 has been entered. An action on the RCE follows.
2. The amendment filed on 02/19/2002 has been entered.

### ***Drawings***

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "25C" has been used to designate two conductive walls. Reference character "25C" of conductive wall located in interlayer insulation film 24 should read "24C". Correction is required.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

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the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Admitted Prior Art (APA) in view of Cook et al. (6,022,791) and Chiang et al. (5,817,572).

Regarding claim 1, APA teaches in figure 2 and related text (pages 1-3) a substrate 21; and a multilayer interconnection structure formed on the substrate (page 1, lines 15-37), the multilayer interconnection structure including: at least first and second interlayer insulation films 24, 25 provided on the substrate; and a guard ring pattern 12 embedded in each of the first and second interlayer insulation films, the guard ring pattern extending along a periphery of the substrate (figure 1B), the multilayer interconnection structure being planarized by using a CMP process (page 5, 11-17),

the guard ring pattern including: a groove 24A formed in each of the first and second interlayer insulation films, a conductive wall 24C filling the groove in each of the first and second interlayer insulation films 24, 25 and extending to a top principal surface thereof; and a conductive pattern 25A making a contact with a top part of the conductive wall 24C and having a principal surface coincident to the top principal surface of the interlayer insulation film 24, the conductive wall 24C in the first interlayer insulation film 24 being offset with respect to the conductive wall 25C in the second interlayer insulation film 25 in a direction parallel to a principal surface of the substrate when viewed in a direction perpendicular to the principal surface of the substrate.

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APA does not teach a guard ring pattern having a groove and a conductive wall changing direction repeatedly and alternatively in a plane parallel to the substrate in one of a triangular wave pattern and a rectangular wave pattern, wherein the conductive wall extends from a bottom principal surface of the interlayer insulation film.

Cook et al. teach in figures 5 and 8 and related text a guard ring pattern 60, 70, respectively having a groove and a conductive wall M0-M4 changing direction repeatedly and alternatively in a plane parallel to the substrate in one of a triangular wave pattern and a rectangular wave pattern (column 4, lines 7-13).

Chiang et al. teach in figure 25 and related text forming a conductive wall 393, 394 extends from a bottom principal surface of the interlayer insulation film 391 to a top principal surface thereof.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a guard ring pattern having a groove and a conductive wall changing direction repeatedly and alternatively in a plane parallel to the substrate in one of a triangular wave pattern and a rectangular wave pattern, as taught by Cook et al., and a conductive wall extends from a bottom principal surface of the interlayer insulation film, as taught by Chiang et al., in APA's device in order to reduce stress and prevent cracks, and in order to provide better control over the depth of the conductive wall and to simplify the method of making the device by a well known processing step, respectively. The combination is motivated by the teachings of Cook et al. who point out the advantages of using a guard ring pattern having a groove and a conductive wall

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changing direction repeatedly and alternatively in a plane parallel to the substrate in one of a triangular wave pattern and a rectangular wave pattern with respect to a guard ring pattern having a straight pattern (column 4, lines 14-24), and by the teachings of Chiang et al. who point out the advantages of forming a conductive wall extending from a bottom principal surface of the interlayer insulation film to a top principal surface thereof by using an etch stop layer in between the two interlayer insulation films (column 3, lines 21-35).

Regarding claim 2, APA teaches in figure 1 a guard ring pattern extending continuously along the periphery of the substrate.

Regarding claim 3, APA teaches in figure 1 a conductive pattern extending in the form of a straight line along peripheral edge of the substrate.

Regarding claim 4, the combination of Cook et al. and APA teach a conductive pattern changes a direction repeatedly and alternatively in the plane parallel in correspondence to the conductive wall.

Regarding claim 5, APA teaches a conductive pattern comprising Cu (page 4, line 28 to page 5, line 17). It would have been obvious to a person of ordinary skill in the art at

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the time the invention was made to use a conductive wall comprises Cu in APA's device in order to improve the problems of signal delay in the device.

Regarding claim 6, APA teaches in figure 2 an interlayer insulation film comprises a first insulation film 24 that support the conductive wall 24C, wherein Chiang et al. teach in figure 25 a second insulation film that supports the conductive pattern 360, 361 laterally. Therefore, the device of APA Chiang et al. teach an interlayer insulation film comprises a first insulation film that support the conductive wall and a second insulation film that supports the conductive pattern laterally, as claimed.

Regarding claim 7 Chiang et al. teach in figure 25 an etch stop layer 390 interposed between the first and second insulation films. Therefore, the device of APA Chiang et al. teach an etch stop layer 390 interposed between the first and second insulation films, as claimed.

### ***Response to Arguments***

6. Applicant's arguments with respect to claims 1-7 have been considered but are moot in view of the new ground(s) of rejection.

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**Papers related to this application may be submitted to Technology center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the TC 2800 Fax center located in Crystal Plaza 4, room 4-C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Group 2811 Fax Center number is (703) 308-7722 and 308-7724. The Group 2811 Fax Center is to be used only for papers related to Group 2811 applications.**

Any inquiry concerning this communication or any earlier communication from the Examiner should be directed to *Examiner Nadav* whose telephone number is **(703) 308-8138**. The Examiner is in the Office generally between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas, can be reached at **(703) 308-2772**.

Any inquiry of a general nature or relating to the status of this application should be directed to the **Technology Center Receptionists** whose telephone number is **308-**

**0956**

A handwritten signature in black ink, appearing to read 'Ori Nadav', with a stylized flourish at the end.

Ori Nadav

March 29, 2002